

Claims:

1. An apparatus for the delivery of a therapeutic agent to a predetermined site within a patient comprising:

5 means for the administration of said therapeutic agent to said patient comprising a reservoir for the therapeutic agent, at least one orifice through which the agent is administered, and a controlled source of energy sufficient to transfer a predetermined amount of the therapeutic agent at a predetermined rate from said reservoir through said orifice to the predetermined site within the patient;

10 a plurality of penetrating electrodes arranged with a predetermined spatial relationship relative to said orifice; and

means for generating an electrical signal operatively connected to said electrodes.

2. The apparatus as recited in claim 1 wherein the electrodes comprise a
15 subassembly that can be separated from the orifice.

3. The apparatus as recited in claim 1 further comprising means for adjusting the predetermined spatial relationship between said electrodes and said orifice.

20 4. The apparatus as recited in claim 3 wherein said means for adjusting the spatial relationship comprises a source of energy.

5. The apparatus as recited in claim 1 wherein the electrodes comprise a conductive, electrochemically stable compound.

25 6. The apparatus as recited in claim 5 wherein the electrodes comprise a conductive metal coated with said conductive, electrochemically stable compound.

7. The apparatus as recited in claim 5 wherein said conductive, electrochemically stable compound consists of at least one of the following materials: titanium nitride, platinum, 30 platinum iridium, iridium oxide.

8. The apparatus as recited in claim 1 wherein the means for administration of the therapeutic agent is a jet injector.

9. The apparatus as recited in claim 8 wherein the source of energy to transfer the therapeutic agent is at least one compressed gas.

10. The apparatus as recited in claim 8 wherein the source of energy to transfer the therapeutic agent is at least one spring.

10 11. The apparatus as recited in claim 8 wherein the jet injection comprises means for controlling the rate at which the agent is transferred through the orifice.

12. The apparatus as recited in claim 1 wherein the means for administration of the therapeutic agent is an automatic injection apparatus.

15 13. The apparatus as recited in claim 12 wherein said reservoir is a syringe including a penetrating hypodermic needle having a medial and a distal end and said orifice is located at the distal end of said needle.

20 14. The apparatus as recited in claim 12 wherein the source of energy to transfer the therapeutic agent is at least one compressed gas.

15. The apparatus as recited in claim 12 wherein the source of energy to transfer the therapeutic agent is at least one spring.

25 16. The apparatus as recited in claim 13 wherein the automatic injection apparatus comprises means for controlling the depth of penetration of said needle into the patient.

30 17. The apparatus as recited in claim 12 wherein the automatic injection apparatus comprises means for controlling the rate at which the agent is transferred through the orifice.

18. The apparatus as recited in claim 1 further comprising extendable shield means for shielding either the agent orifice or the electrodes from a user of the apparatus when the orifice or the electrodes are not in contact with the patient.

5 19. The apparatus as recited in claim 18 wherein said extendable shield means includes at least one source of energy to extend said shield when the orifice or the electrodes are not in contact with the patient.

10 20. The apparatus as recited in claim 18 wherein said extendable shield means extends to shield either the agent orifice or the electrodes after the orifice or the electrodes are removed from contact with the patient.